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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,881	09/26/2006	Masahiko Iijima	129231	2918

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EXAMINER	
KWON, ASHLEY M	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
04/21/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,881	IIJIMA ET AL.	
	Examiner	Art Unit	
	ASHLEY KWON	4111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/31/08; 8/28/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims Analysis

Regarding claim 1, the phrases "...for accelerating a reaction of a reaction active material supplied to the fuel cell during generation of electricity in the fuel cell..." and "...for suppressing a decomposition reaction of the solid oxide due to the catalytic metal part for suppressing a composition reaction of the solid oxide due to the catalytic metal..." and "...for allowing ions of a same type of conductivity to pass through the electrolyte layer..." is regarded as intended use and given no patentable weight. Therefore claim is interpreted as a fuel cell comprising an electrolyte layer made from a solid oxide, a catalytic metal part including a catalytic metal, wherein the catalytic metal is a noble metal; and a decomposition reaction suppress part disposed between the electrolytic layer and the catalytic metal part, wherein the decomposition reaction suppress part has ion conductivity.

Regarding claim 9, the phrases "...for accelerating a reaction of a reaction active material supplied to the fuel cell during generation of electricity in the fuel cell..." and "...for suppressing a decomposition reaction of the solid oxide due to the catalytic metal..." is regarded as intended use and given no patentable weight. Therefore, claim 9 is interpreted as a fuel cell comprising: a catalytic metal part including a catalytic metal, wherein the catalytic metal is a noble metal; and an electrolyte layer formed with a solid oxide, disposed adjacent to the catalytic metal part, and having a decomposition reaction suppress part.

Regarding claims 4 and 8, the phrase "the catalytic metal part is formed with catalytic metal dispersed in a support formation in a granular state **on** the electrolyte layer" will be interpreted as the catalytic metal part only needing to be one of the layers on the electrolyte layer, and need not be in direct contact with the electrolyte layer.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 10, it is unclear how the decomposition reaction suppress part has a lower grain boundary density of the **solid oxide other than the regions in the electrolyte layer.** Applicant is asked to please clarify.

Regarding claim 11, it is unclear how the **solid oxide** has lower decomposition reactivity for decomposition due to the catalytic metal **than other regions in the electrolyte layer**. Applicant is please asked to clarify.

Regarding claim 12, it is unclear how the **solid oxide** for forming the decomposition reaction suppress part has lower ion **in** ion conductivity than the **solid oxide for forming the other regions.** Applicant is asked to please clarify.

Regarding claims 13 and 14, it is unclear what is meant by "the catalytic metal part is a **fine** hydrogen permeable metal layer...". For the purposes of this rejection, the work "fine" will be interpreted as thin.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Doshi et al. (US Pat. Pub. 2002/0177031) (hereinafter "Doshi").

Regarding claim 1, Doshi discloses a fuel cell comprising: an electrolyte layer made from a solid oxide (see paragraph 24); a catalytic metal part (catalyst layer, 21) including a catalytic metal for accelerating a reaction of a reaction active material supplied to the fuel cell during generation of electricity in the fuel cell, wherein the catalytic metal is a noble metal (Pt); and a decomposition reaction suppress part (conductive layer, 20; see paragraph 34) for suppressing a decomposition reaction of the solid oxide due to the catalytic metal, wherein the decomposition reaction suppress part has ion conductivity for allowing ions of a same type of conductivity to pass through the electrolyte layer (see paragraphs 32, 34, and 37; see fig. 2).

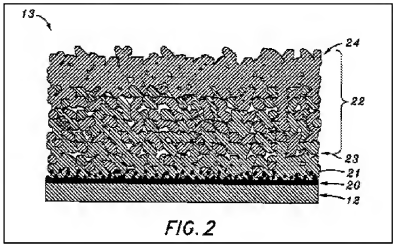


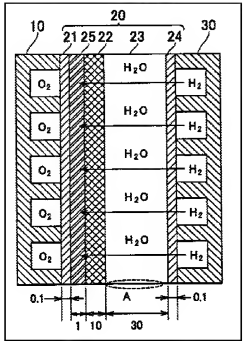
FIG. 2

Regarding claim 9, Doshi discloses a fuel cell comprising: a catalytic metal part (catalyst layer, 21) including a catalytic metal, wherein the catalytic metal is a noble metal (Pt, see paragraph 37)); and an electrolyte layer formed with a solid oxide, disposed adjacent to the catalytic metal part, and having a decomposition reaction suppress part (conductive layer, 20; see paragraph 34) (see paragraph 32; see fig. 1).

Claims 1 and 9 are rejected under 35 U.S.C. 102(a) as being anticipated by Ito et al. (US Pat. Pub. 2004/0043277) (hereinafter "Ito").

Regarding claim 1, Ito discloses a fuel cell comprising an electrolyte layer made from a solid oxide (electrolyte layer, 23), a catalytic metal part (dense layer, 21) including a catalytic metal, wherein the catalytic metal is a noble metal (Pd, see paragraph 42); and a decomposition reaction suppress part (metal diffusion suppression layer, 25) disposed between the electrolytic layer and the catalytic metal part, wherein the decomposition reaction suppress part has ion conductivity (see fig. 4).

FIG. 4



Regarding claim 9, Ito discloses a fuel cell comprising: a catalytic metal part (dense layer, 21) including a catalytic metal, wherein the catalytic metal is a noble metal (Pd, see paragraph 42); and an electrolyte layer formed with a solid oxide (electrolyte layer, 23), disposed adjacent to the catalytic metal part, and having a decomposition reaction suppress part (metal diffusion suppression layer, 25) (see fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 3, 5-7, and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito. Ito is applied to claims 1 and 9 above.

Regarding claim 2, Ito discloses a fuel cell in accordance with claim 1, wherein the decomposition reaction suppress part is constructed with a decomposition resistant material that has lower decomposition reactivity for decomposing due to the catalytic metal than the solid oxide. Ito teaches that the decomposition reaction suppress part (metal diffusion suppression layer, 25) can be WO_3 (see paragraph 43), and in another embodiment teaches that the solid oxide (electrolyte layer, 23) can be $BeCeO_3$ based (see paragraph 48). Applicant discloses on pg. 15 lines18-25, that WO_3 has a lower decomposition reactivity than $BaCeO_3$. The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International*

Co. v. Teleflex Inc., 550 U.S. __,__, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). It would have been obvious to a person of ordinary skill in the art to combine the metal diffusion suppression layer of one of the embodiments of Ito, with the $BeCeO_3$ solid oxide electrolyte of another embodiment of Ito in order to inhibit mutual diffusion of different kinds of metal (see paragraph 42).

Regarding claim 3, Ito disclose a fuel cell in accordance with claim 2, wherein the decomposition reaction suppress part is formed in a layer form for covering the electrolyte surface with the decomposition-resistant material, and the catalytic metal part is disposed on the decomposition reaction suppress part (see fig. 4).

Regarding claim 5, Ito discloses a fuel cell in accordance with claim 1, wherein the decomposition reaction suppress part is formed with a low decomposition material that has lower activity for decomposing the solid oxide than the catalytic metal. Ito teaches that the decomposition reaction suppress part (metal diffusion suppression layer, 25) can be WO_3 (see paragraph 43), and in another embodiment teaches that the solid oxide (electrolyte layer, 23) can be $BeCeO_3$ based (see paragraph 48). Applicant discloses on pg. 15 lines18-25, that WO_3 has a lower decomposition reactivity than $BaCeO_3$. The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. __,__, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). It would have been obvious to a person of ordinary skill in the art to combine the metal diffusion suppression layer of one of the embodiments of Ito, with the $BeCeO_3$ solid oxide electrolyte of another embodiment of Ito in order to inhibit mutual diffusion of

different kinds of metal (see paragraph 42).

Regarding claim 6, Ito discloses a fuel cell in accordance with claim 5, wherein the low decomposition material also has conductivity. Ito teaches that the decomposition reaction suppress part (metal diffusion suppression layer, 25) can be WO_3 (see paragraph 43). Applicant discloses on pg. 15 lines 22-23 that WO_3 is a compound conductor having proton and electron conductivity.

Regarding claim 7, Ito discloses a fuel cell in accordance with claim 1, wherein the decomposition reaction suppress part (metal diffusion suppression layer, 25) is formed in a layer form to cover the electrolyte surface (electrolyte layer, 23) with the low decomposition material (WO_3), and the catalytic metal part (dense layer, 21) is disposed on the decomposition reaction suppress part (see fig. 4).

Regarding claim 13, Ito discloses a fuel cell in accordance with claim 1, wherein the solid oxide (electrolyte layer, 23) has proton conductivity, the catalytic metal is a hydrogen permeable metal (Pd, see paragraph 42), and the catalytic metal part is a fine hydrogen permeable metal layer for covering the decomposition reaction suppress part disposed on the electrolyte later (see fig. 4).

Regarding claim 14, Ito discloses a fuel cell in accordance with claim 9, wherein the solid oxide (electrolyte layer, 23) has proton conductivity, the catalytic metal is a hydrogen permeable metal (Pd, see paragraph 42), and the catalytic metal part is a fine hydrogen permeable metal layer for covering the decomposition reaction suppress part disposed on the electrolyte later (see fig. 4).

Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito as applied to claims 1-3, 5-7, and 13 above, and further in view of Watanabe (US Pat. No. 5,800,938).

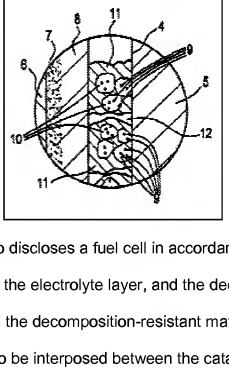
Regarding claim 4, Ito discloses a fuel cell in accordance with claim 2, wherein the catalytic metal part is on the electrolyte layer, and the decomposition reaction suppress part is formed with the decomposition-resistant material for covering a part of the catalytic metal such as to be interposed between the catalytic metal and the electrolytic layer. Ito discloses that various techniques, for example sputtering, can be used for forming the layers (see paragraph 52).

Ito fails to disclose that the catalytic metal part is formed with catalytic metal dispersed in a support formation in a **granular** state.

However, Watanabe teaches a layer of catalyst metal particles formed on one of two ion exchange membranes by supporting a layer of desired thickness of the catalyst particles by means of sputtering (see col. 4, lines 5-7). Watanabe also teaches a cathode electrocatalyst particles 10 or 30 comprised of carbon particles supporting an electrocatalayst metal 9 such as platinum (see col.5, lines 37-40; see fig. 2). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. __,__, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). Therefore, it would have been obvious to provide the catalytic metal in a granular state in order for it to be more conducive to the process of sputtering. It also would have been obvious to a person of ordinary skill in the art, that since the catalytic metal is granular, the decomposition-

resistant material would be interposed between *grains* of the catalytic metal and the electrolyte layer.

FIG. 2



Regarding claim 8, Ito discloses a fuel cell in accordance with claim 1, wherein the catalytic metal part is on the electrolyte layer, and the decomposition reaction suppress part is formed with the decomposition-resistant material for covering a part of the catalytic metal such as to be interposed between the catalytic metal and the electrolytic layer. Ito discloses that various techniques, for example sputtering, can be used for forming the layers (see paragraph 52).

Ito fails to disclose that the catalytic metal part is formed with catalytic metal dispersed in a support formation in a **granular** state.

However, Watanabe teaches a layer of catalyst metal particles formed on one of two ion exchange membranes by supporting a layer of desired thickness of the catalyst particles by means of sputtering (see col. 4, lines 5-7). Watanabe also teaches a cathode electrocatalyst particles 10 or 30 comprised of carbon particles supporting an

electrocatalayst metal 9 such as platinum (see col.5, lines 37-40; see fig. 2). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. __,__, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). Therefore, it would have been obvious to provide the catalytic metal in a granular state in order for it to be more conducive to the process of sputtering. It also would have been obvious to a person of ordinary skill in the art, that since the catalytic metal is granular, the decomposition-resistant material would be interposed between *grains* of the catalytic metal and the electrolyte layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASHLEY KWON whose telephone number is (571)270-7865. The examiner can normally be reached on Monday to Friday 7:30 - 5pm EST with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AK

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795